Road M9-0.0-0.53, High Priority Road Drainage Improvement and Revegetation

EXISTING CONDITIONS AND PROJECT DESCRIPTION:

Road M9 (M9) is a rocked road that provides access into a small subwatershed informally known as No Name Gulch located at milepost 4.78 along Road M1 (see Location Map, Sheet 2). M9 is approximately two miles long and switchbacks up a steep north-facing slope, then winds around a broad spur ridge and eventually joins Road HC1 (HC1) that traverses High Chute Ridge. In turn, HC1 connects to County Road 720 approximately 2 miles north of the intersection with M9. Thus, M9 is a link in a 14-mile loop through the heart of the Big River Unit and up to county roads that lead either to the town of Mendocino and Big River Beach or the city of Willits.

A loop road for vehicle traffic at this location appears desirable to achieve restoration goals for the Big River Unit. More specifically, if M9 and HC1 were used to provide vehicle access down to the river, approximately 3 miles of the M1 road adjacent to Big River could be eliminated as part of the mainstem restoration effort. In addition, M9 provides access to Roads M9.1 and 9.3 that lead into other subwatersheds that have been identified as high priority restoration areas. Because M9 appears to provide significant potential for watershed restoration within the Big River Unit, the California Department of Parks and Recreation (DPR) considers maintenance of this road to be a high priority.

Along the first 1,500 feet from the intersection with M1, Road M9 traverses the base of a steep (~55 percent) slope and lies within approximately 150 feet of the Class II watercourse that drains No Name Gulch. The natural slope above the road is steep and has been highly modified by skid trail construction, the upslope section of M9, timber harvesting, shallow debris sliding, and dormant landsliding. Consequently, this slope is considered disturbed and having a relatively high potential for instability. The slope below the road is mapped as a debris slide slope (Smelser and others, 2004).

This lower stretch of M9 was constructed by cutting into the disturbed slope using typical cut- and side-cast fill design that created oversteepened fill slopes upslope of the watercourse. In addition, the road was constructed as generally insloped with an inside ditch and outboard edge berm. Oversteepened sidecast fillslopes typically have a much higher potential for failure than do engineered fill slopes constructed with compacted fill. Construction of oversteepened side-cast fillslopes on natural slopes with a high potential for instability further increases the potential for fillslope failures that remove portions of the road. When such conditions are located close to watercourses, a fillslope failure commonly delivers sediment directly into the watercourse. In the winter of 2003/2004, a portion of the fillslope failed at milepost 0.2 reducing the roadway width and delivering sediment into the stream. Because of that failure, this roadway segment is now classified as high priority remediation site.

Maintaining this lower (1,500 feet) of M9 appears worthwhile at this time because of the need for access into the watershed and because the M9/HC1 loop road may significantly increase restoration potential along Big River and its estuary. While maintaining this lower segment appears worthwhile, the level of maintenance needs to be balanced with the understanding that:

1) this road is poorly constructed in a poor location (i.e., likely to be costly to maintain as an all-weather all-vehicle access road), and
2) it may later be determined that the M9/HC1 loop road is undesirable.

With such an understanding, only a minimum maintenance effort appears warranted at this time. One way of determining the level of such an effort can be determined by examining the contributing factors that led to the 2003/2004 fillslope failure.

Engineering geologic analysis by the California Geological Survey of the 2003/2004 failure revealed that:

1) stormwater runoff from the upper segment of M9 appears to have discharged via a ditch relief culvert onto the disturbed slope immediately above the roadway failure;
2) the slope area immediately above the failure is significantly disturbed by skid trails, disrupted drainage paths, and shallow debris slides;
3) shallow rills in the roadway and leading to the failed section indicates uncontrolled roadway runoff;
4) vegetation within the inside ditch and local cutslope sloughing appears to have reduced the capacity of the inside ditch thereby promoting uncontrolled drainage down the road;
5) relatively lush vegetation along the inside ditch at the failure location indicates that this area may be saturated year-round and may also pond water;
6) at its narrowest point the failure has reduced the roadway width to 12 feet;
7) soil pipes in the headscarp indicate that significant volumes of near-surface groundwater helped saturate the fillslope at this location; and
8) the area of failed ground (headscarp and zone of depletion) is unvegetated and vulnerable to gully erosion and sloughing.

In summary, the analysis of contributing factors strongly indicates that several aspects of the existing roadway drainage system failed resulting in the accumulation of a significant amount of water along the road at this location. The accumulation in turn leading to saturation and eventual failure of the weak and poorly constructed fillslope along with some underlying native material at this location. The failed roadway drainage system continues to cause rill erosion within the landslide scar area. In conclusion, the minimal level of maintenance appears to require: 1) repair and enhancement of the roadway drainage system; and 2) erosion control and revegetation of the landslide scar area.

It should be noted that outsloping and construction of rolling dips along this segment of road is considered beyond a minimal level of maintenance because such work requires heavy equipment and there are currently no specific plans for motorized vehicle use on M9. When such plans are developed, heavy equipment can be employed in outsloping etc., at that time.

The California Department of Parks and Recreation (DPR) proposes to improve the existing drainage system along the lower M9 road segment and revegetate the scar area of the recent fillslope failure. Using only hand labor, the project tasks include:

1) clearing the inside ditch;
2) constructing waterbars at 100-foot intervals along the lower 0.5-miles of M9;
3) installing check dams along rills within the scar area; and
4) terracing and replanting the scar area.

TASK DESCRIPTIONS FOR WORK ALONG M9

0+00 to 28+00 Using hand labor, clear the inside ditch and construct waterbars at 100-foot intervals (unless otherwise specified) under the direction of the PI; waterbars shall be constructed with PI approval at natural landscape swales located at approximate stations 0+80, 1+80, 3+15, 6+80, 10+00, 13+70, 18+25, 21+30, 23+30 and 26+10.

11+20 to 12+50 Ensure no ponding of water along the road within this area and no discharge of water onto the scar area from the road.

11+20 to 12+50 Using hand labor within the scar area of the recent fillslope failure, construct small check dams (rock piles) in the established erosional rills under the direction of the PI; enhance existing bench areas as drainage control areas as well as for concentrated plantings; terrace and revegetate scarred area under the direction of DPR ecologists.

19+00 to 20+50 Plug the existing ditch relief culvert under the direction of the PI and allow no roadway runoff onto the slope area that is above the failed roadway section.

REFERENCE:

Smelser, M.G., Haydon, W.D., and Reynolds, S.D., 2004, Engineering geologic resource assessment, Big River State Park, Mendocino County, California, prepared by the California Geological Survey for the California Department of Parks and Recreation under Interagency Agreement, BAM 788-00,32 p., 4 app, 3 plates.

PROFESSIONAL GEOLOGIST
M.G. SMELSER
No. 2192
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

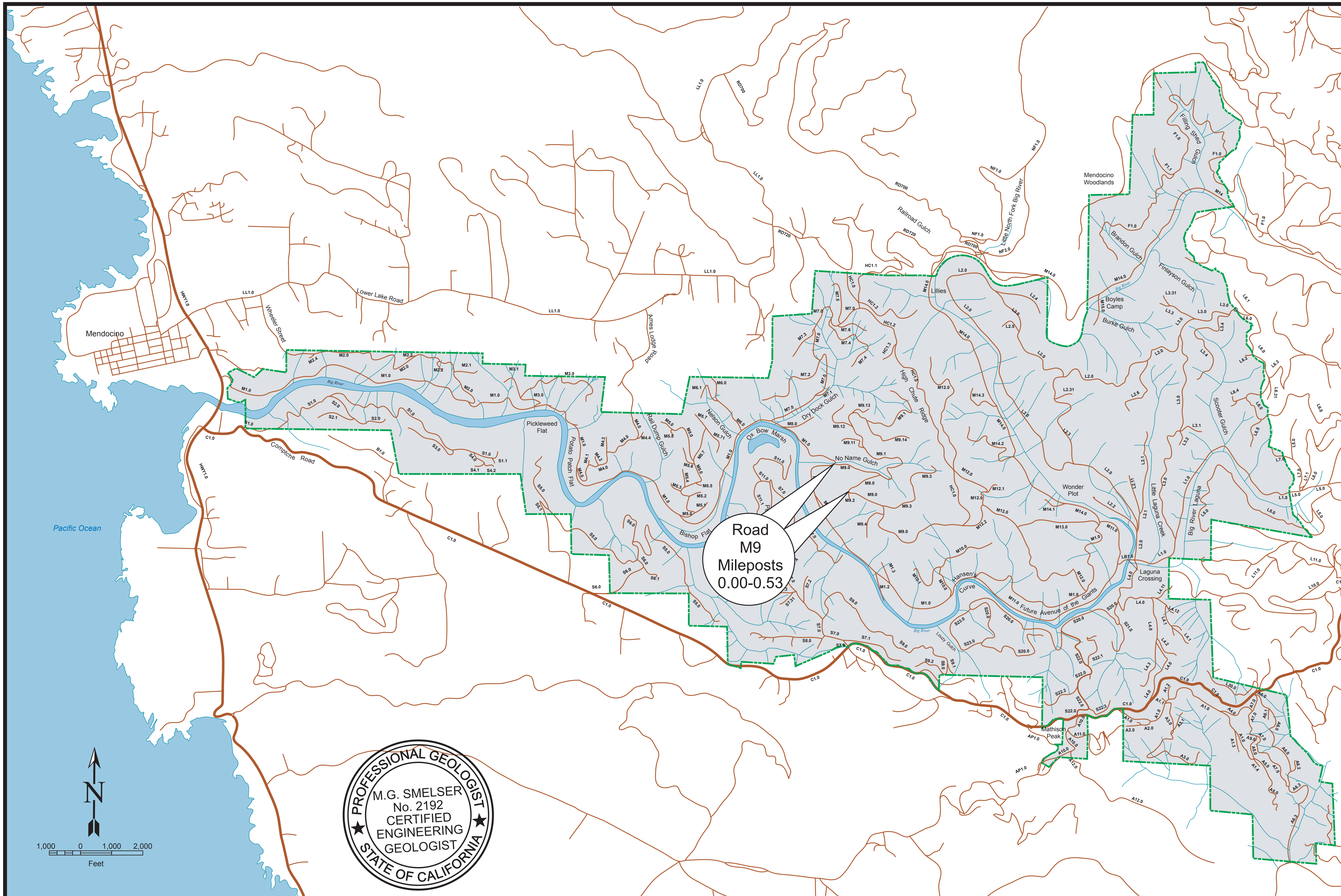
SHEET: 1 of 4

TITLE: Plan Sheet 1, Project Description and Tasks

SCALE: none

DATE: February 27, 2006

PROJECT:
Road M9-0.0-0.53, High Priority Road Drainage Improvement and Revegetation
Big River Unit
Mendocino Headlands State Park, Mendocino, CA



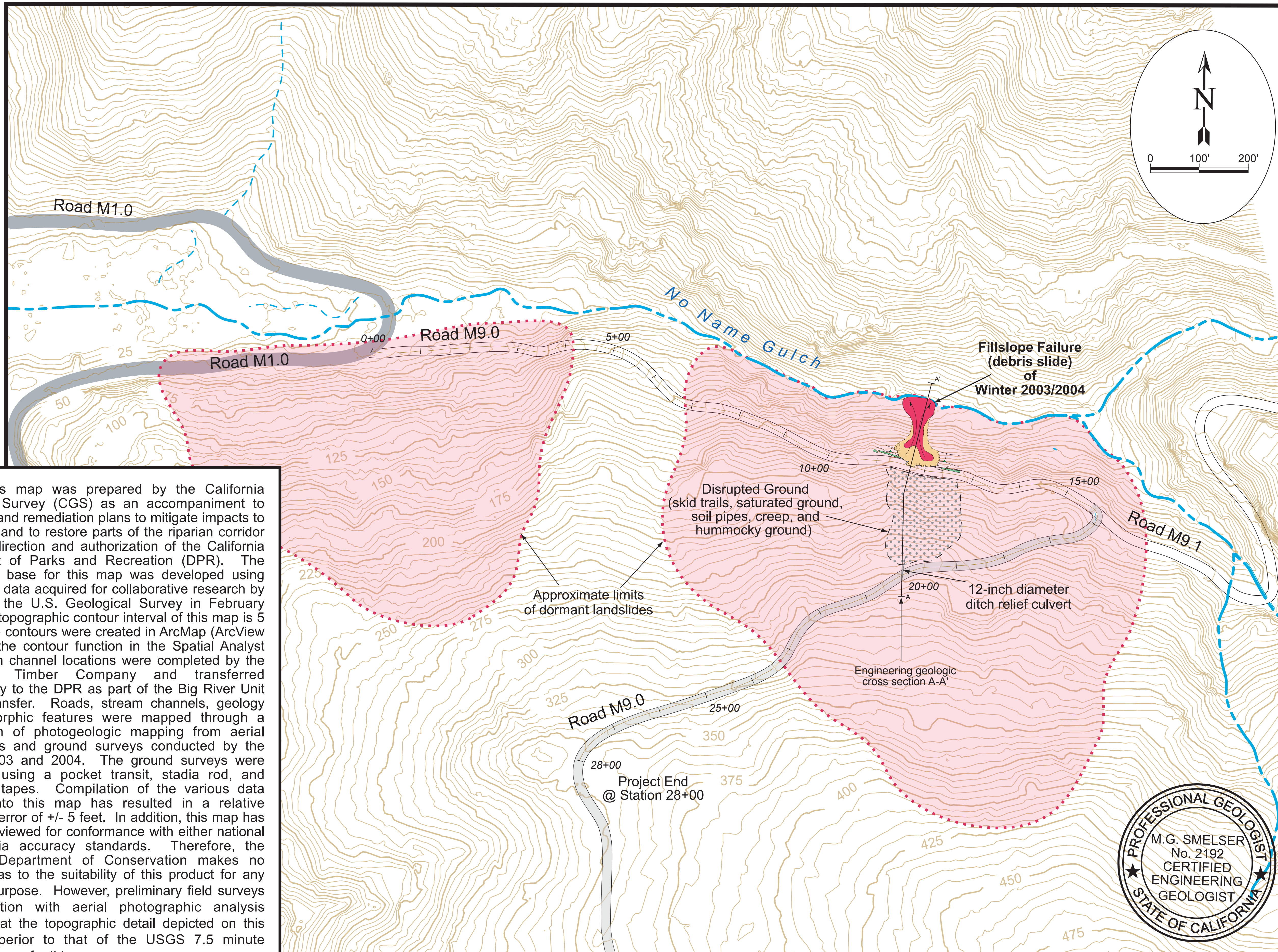
SHEET: 2 of 4

TITLE: Plan Sheet 2, Location Map

SCALE: 1 inch = 3,000 feet

DATE: February 27, 2006

PROJECT: Road M9-0.0-0.53, High Priority Road Drainage Improvement and Revegetation
Big River Unit
Mendocino Headlands State Park, Mendocino, CA



NOTE: This map was prepared by the California Geological Survey (CGS) as an accompaniment to restoration and remediation plans to mitigate impacts to Road M9.0 and to restore parts of the riparian corridor under the direction and authorization of the California Department of Parks and Recreation (DPR). The topographic base for this map was developed using topographic data acquired for collaborative research by NASA and the U.S. Geological Survey in February 2003. The topographic contour interval of this map is 5 feet and the contours were created in ArcMap (ArcView 8.3) using the contour function in the Spatial Analyst tool. Stream channel locations were completed by the Hawthorne Timber Company and transferred electronically to the DPR as part of the Big River Unit property transfer. Roads, stream channels, geology and geomorphic features were mapped through a combination of photogeologic mapping from aerial photographs and ground surveys conducted by the CGS in 2003 and 2004. The ground surveys were completed using a pocket transit, stadia rod, and measuring tapes. Compilation of the various data sources onto this map has resulted in a relative planimetric error of +/- 5 feet. In addition, this map has not been reviewed for conformance with either national of California accuracy standards. Therefore, the California Department of Conservation makes no warranties as to the suitability of this product for any particular purpose. However, preliminary field surveys in conjunction with aerial photographic analysis indicates that the topographic detail depicted on this map is superior to that of the USGS 7.5 minute quadrangle map for this area.

SHEET: 3 of 4

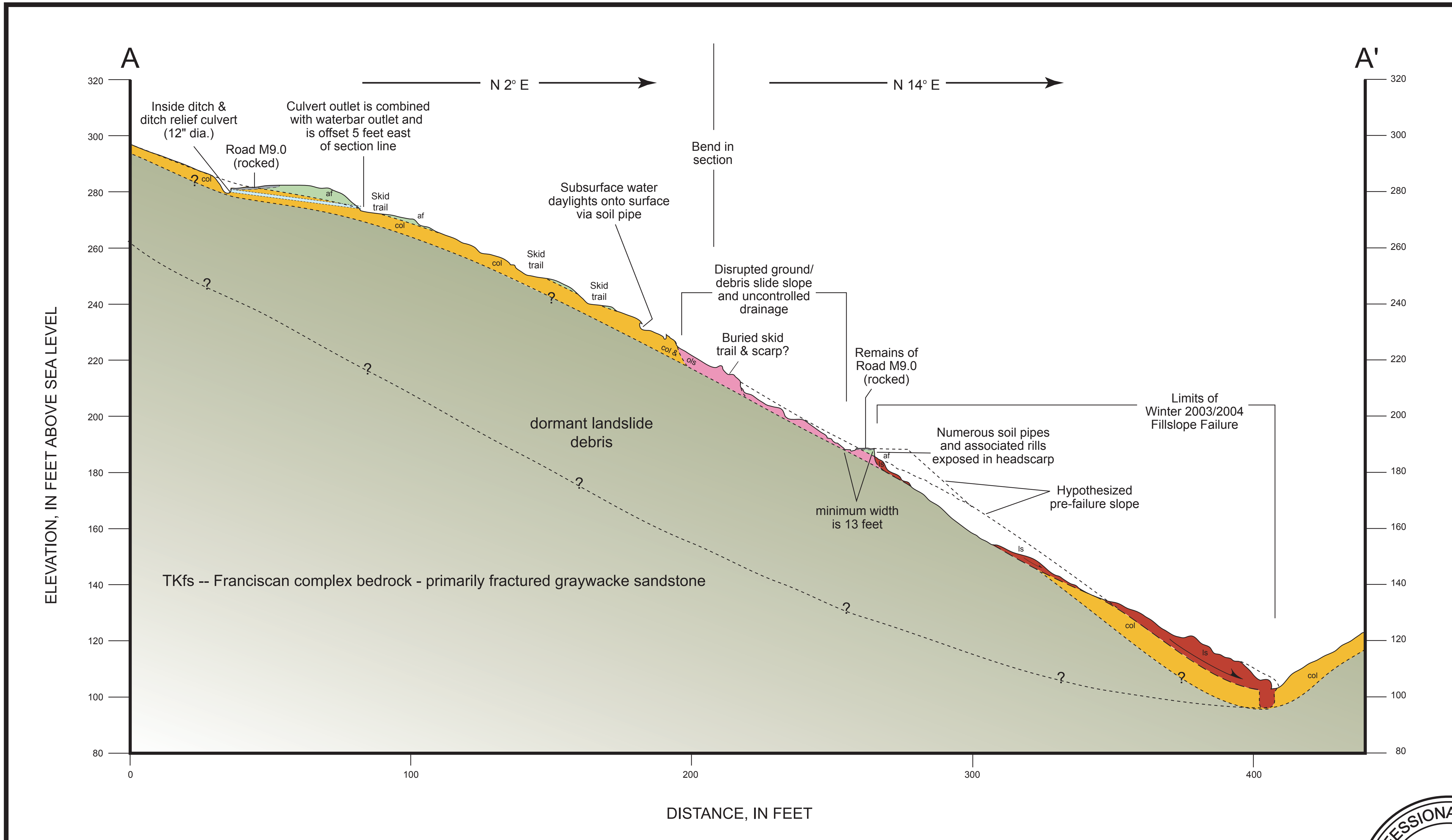
TITLE: Plan Sheet 3, Map of Road M9.0 & Fillslope Failure

SCALE: 1 inch = 200 feet

DATE: February 27, 2006

PROJECT: Road M9-0.0-0.53, High Priority Road Drainage Improvement and Revegetation
Big River Unit
Mendocino Headlands State Park, Mendocino, CA

ENGINEERING GEOLOGIC CROSS SECTION A-A'
THROUGH ROAD M9-0.2 FILLSLOPE FAILURE



af	Artifical Fill	ls	Recent Landslide Debris
col	Colluvium	ols	Likely Landslide Debris

PROFESSIONAL GEOLOGIST
M.G. SMELSER
No. 2192
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

SHEET: 4 of 4

TITLE: Plan Sheet 4
Engineering Geologic Cross Section A-A'

SCALE: 1 inch = 40 feet

DATE: February 27, 2006

PROJECT: Road M9-0.0-0.53 High Priority Road Drainage Improvement and Revegetation
Big River Unit
Mendocino Headlands State Park, Mendocino, CA